

5.5
Hyperbolas

key

Name _____ Date _____ Period _____

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Find the vertices and foci of the hyperbola.

1) $\frac{y^2}{36} - \frac{x^2}{13} = 1$

vert. : (0,6) (0,-6)

foci : (0,7) (0,-7)

1) _____

2) $\frac{9x^2}{36} - \frac{4y^2}{36} = \frac{36}{36}$

vert : (2,0) (-2,0)

foci : ($\sqrt{13}$, 0) ($-\sqrt{13}$, 0)

2) _____

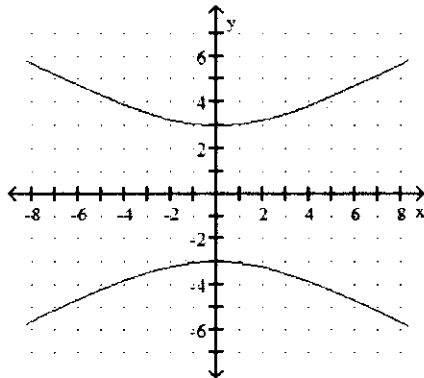
$\frac{x^2}{4} - \frac{y^2}{9} = 1$

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Match the given graph with its equation.

3)

3) D



A) $\frac{x^2}{9} + \frac{y^2}{25} = 1$

B) $\frac{y^2}{9} + \frac{x^2}{25} = 1$

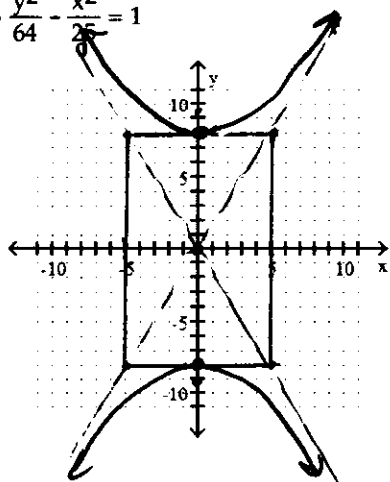
C) $\frac{y^2}{25} - \frac{x^2}{9} = 1$

D) $\frac{y^2}{9} - \frac{x^2}{25} = 1$

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Graph the hyperbola.

4) $\frac{y^2}{64} - \frac{x^2}{25} = 1$



Center: $(0,0)$

$a = 8$ $c = 2\sqrt{22}$

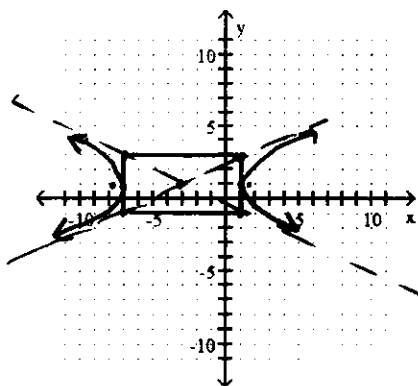
$b = 5$

vert: $(0,8)(0,-8)$ foci: $(0, \pm 2\sqrt{22})$

Asymp: $y = \pm \frac{8}{5}x$

4) _____

5) $\frac{(x+3)^2}{16} - \frac{(y-1)^2}{4} = 1$



Center: $(-3,1)$

$a = 4$ $c = 2\sqrt{5}$

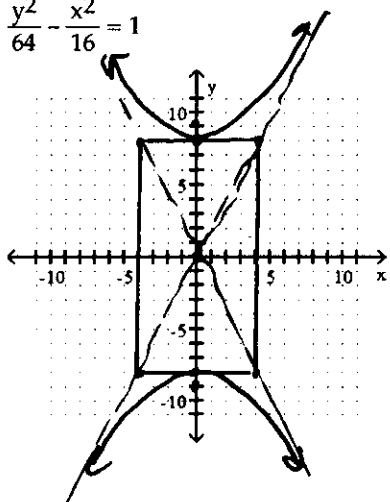
$b = 2$

vert: $(-7,1)(1,1)$ foci: $(-3 \pm 2\sqrt{5}, 1)$

Asymp: $y-1 = \pm \frac{1}{2}(x+3)$

5) _____

6) $\frac{y^2}{64} - \frac{x^2}{16} = 1$



Center: $(0,0)$

vert: $(0,8)(0,-8)$ foci: $(0, \pm 4\sqrt{5})$

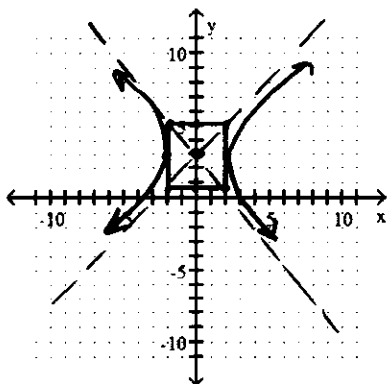
$a = 8$ $c = 4\sqrt{5}$

$b = 4$

Asymp: $y = \pm 2x$

6) _____

7) $\frac{x^2}{4} - \frac{(y-3)^2}{5} = 1$



Center: $(0, 3)$

$a = 2 \quad c = 3$

$b = \sqrt{5}$

vert: $(2, 3), (-2, 3)$ foci: $(3, 3), (-3, 3)$

Asymp: $y - 3 = \pm \frac{\sqrt{5}}{2} x$

7) _____

Find an equation in standard form for the hyperbola that satisfies the given conditions.

8) Foci at $(0, \pm 3)$, transverse axis with length 4

8) _____

$$\frac{y^2}{4} - \frac{x^2}{5} = 1$$

9) Center $(0, 0)$, $a = 5$, $e = 2$, horizontal focal axis

9) _____

$$\frac{x^2}{25} - \frac{y^2}{75} = 1$$

10) Center $(0, 0)$, $c = 6$, $e = 2$, horizontal focal axis

10) _____

$$\frac{x^2}{9} - \frac{y^2}{27} = 1$$

11) Transverse axis endpoints $(-1, 3)$ and $(5, 3)$, slope of one asymptote $4/3$

11) _____

$$\frac{(x-2)^2}{9} - \frac{(y-3)^2}{16} = 1$$

12) Foci $(-3, -11)$ and $(-3, 0)$, transverse axis endpoints $(-3, -9)$ and $(-3, -2)$

12) _____

$$\frac{(y + \frac{11}{2})^2}{49/4} - \frac{(x+3)^2}{18} = 1$$

Find the center, vertices and foci of the hyperbola.

13) $\frac{(x+1)^2}{144} - \frac{(y-2)^2}{25} = 1$

Center: $(-1, 2)$

vert: $(11, 2) (-13, 2)$

foci: $(12, 2) (-14, 2)$

13) _____

Find the vertices and foci of the hyperbola.

14) $\frac{(y-1)^2}{25} - \frac{(x+5)^2}{11} = 1$

Center: $(-5, 1)$

vert: $(-5, -4) (-5, 6)$

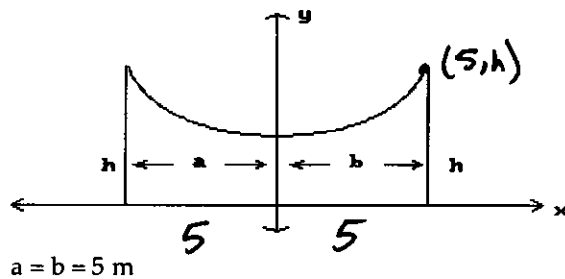
foci: $(-5, -5) (-5, 7)$

14) _____

Solve the problem.

- 15) The roof of a building is in the shape of the hyperbola $y^2 - x^2 = 64$, where x and y are in meters. Refer to the figure and determine the height h of the outside walls.

15) _____



$$y^2 - x^2 = 64$$

$$h^2 - (5)^2 = 64$$

$$h^2 = 64 + 25$$

$$\sqrt{h^2} = \sqrt{89}$$

$$h = \underline{9.4 \text{ meters!}}$$